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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/809,038	03/16/2001	Shuji Nakamura	160-356	5596

7590 03/04/2002

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EXAMINER

LOUIE, WAI SING

ART UNIT PAPER NUMBER

2814

DATE MAILED: 03/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/809,038

Applicant(s)

NAKAMURA ET AL.

Examiner

Wai-Sing Louie

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 63-71 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 63-71 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 63-71 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 5,652,434 in view of Nakamura et al. (US 5,959,307).

With regard to claim 63-64, US 5,652,434 discloses a gallium nitride light-emitting device comprising:

- An n-type layer comprising an n-type GaN or an n-type nitride semiconductor containing indium and gallium (claim 1 and 2);
- A first p-type layer comprising a p-type nitride semiconductor containing indium and gallium (claim 1 and 2);
- US 5,652,434 does not disclose an active layer. However, Nakamura et al. disclose a gallium nitride light-emitting device having an active layer 16, which has a multi-quantum well structure (col. 6, lines 1-4). The well layer comprises a nitride semiconductor represented by $\text{In}_f\text{Ga}_{1-f}\text{N}$, $0 < f < 1$ (col. 6, lines 5-7) and a

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barrier layer comprises a nitride semiconductor represented by $\text{In}_F\text{Ga}_{1-F}\text{N}$, $0 < F < 1$ (col. 6, lines 30-32). Nakamura et al. teach a ternary mixed crystal InGaN provides an active layer having a better crystallinity and enhanced light-emitting output power (col. 6, lines 10-13). Hence, it would have been obvious to one with ordinary skill in the art to provide a multi-quantum well structure having InGaN semiconductor layers. Doing so would enhance the light-emitting output power.

- US 5,652,434 does not disclose a second p-type clad layer. However, Nakamura et al. disclose a p-type clad layer 101. Nakamura et al. teach a thin p-type clad layer for the hole carriers to tunnel through (col. 7, lines 42-44). Hence, it would have been obvious to one with ordinary skill in the art to provide a second p-type clad layer in order to confine the hole carriers.
- US 5,652,434 does not disclose a p-type contact layer formed of a p-type GaN provided over the first p-type clad layer. However, Nakamura et al. disclose a p-type contact layer 17, which is an Mg -doped GaN (col. 8, lines 56-60). Nakamura et al. teach the contact layer should have the highest carrier concentration to establish a good ohmic contact with the electrode (col. 8, lines 60-63). Hence, it would have been obvious to one with ordinary skill in the art to provide a contact layer in order to have a good ohmic contact with the electrode.

With regard to claim 65, US 5,652,434 discloses a first p-type layer comprising a p-type nitride semiconductor containing indium and gallium, which containing no aluminum (claim 1), but does not disclose a second p-type clad layer. However, Nakamura et al. disclose a second p-type clad layer 103, which is a p-type AlGaIn layer (col. 8, line 40). Nakamura et al. teach this

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layer has a large band gap to act as a carrier confinement and light confinement layer (col. 8, lines 42-55). Hence, it would have been obvious to one with ordinary skill in the art to provide a second p-type clad layer in order to provide confinement for the hole carriers.

With regard to claim 66, US 5,652,434 modified by Nakamura et al., in claim 63 above and claim 71 below, would have the p-type contact formed of p-type GaN and an n-type contact formed of an n-type GaN.

With regard to claim 67-71, in addition to the limitations disclosed in claim 63 and 64, US 5,652,434 also discloses:

- A substrate (claim 1);
- US 5,652,434 does not disclose an n-type GaN contact layer. However, Nakamura et al. disclose an n-type GaN contact layer 13 (col. 5, line 38). Nakamura et al. teach an n-type GaN contact layer would establish a preferable ohmic contact to decrease the threshold current (col. 5, lines 41-48). Hence, it would have been obvious to one with ordinary skill in the art to provide an n-type GaN contact layer in order to provide an ohmic contact with the electrode;
- US 5,652,434 does not disclose a second n-type clad layer. However, Nakamura et al. disclose an n-type clad layer 14 comprises n-type AlGaIn (col. 5, line 60). Nakamura et al. teach an n-type clad layer is for confining the n-type carrier (col. 5, lines 57-60). Hence, it would have been obvious to one with ordinary skill in the art to provide a second n-type clad layer in order to provide confinement for the electrons.

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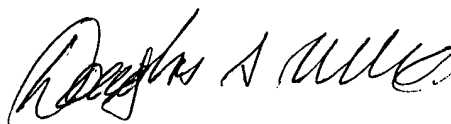
- A first p-type layer formed of p-type AlGa_N provided over the active layer (claim 1 and 2);
- US 5,652,434 modified by Nakamura et al. in claim 65 would have the second p-type clad layer 103, which have a thickness of 0.05 to 1 μm (col. 8, line 49);
- A negative electrode (claim 1);
- A positive electrode (claim 1);

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474.

The examiner can normally be reached on 7:30 AM to 4:00 PM.

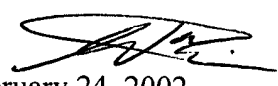
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Douglas A. Wille
Patent Examiner

wsl



February 24, 2002